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ABSTRACT

It was hypothesized that a person's estimates of the preventability of health problems would be related to health behaviors such that a person who engages in healthful behavior should make higher estimates of preventability. A study was conducted to investigate the relationship between causal attribution of health problems and health-related behavior. College students (N=57) completed the Preventability Scale by estimating the extent to which a number of problems could have been prevented by the victim of the problem. Their estimates, reported in terms of the percentage of cases that they considered to be preventable, constituted the dependent variable. Subjects also completed the Multidimensional Health Locus of Control scales and a self-report questionnaire of health-related behaviors. The independent variable was the frequency with which subjects engaged in such health-related behaviors as exercise, diet control, smoking, and thrill seeking. The results showed that subjects differed significantly regarding their estimates of preventability of heart attack depending upon how much jogging and other exercise they did. People who jogged often though heart attacks and hypertension were more preventable than did subjects who jogged less often or not at all. The findings have implications for cognitive behavior modification and cooperation with prescribed lifestyle changes. (Author/NB)

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Estimates of preventability and their relation to health behavior

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Running head: The Preventability Scale

Estimates of Preventability and Their Relation to Health Behavior

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Running Head: THE PREVENTABILITY SCALE

Abstract

This study investigates the relationship between causal attribution of health problems and health-related behavior. Subjects were asked to estimate the extent to which a number of problems could have been prevented by the victim of the problem. Their estimates, reported in terms of the percentage of cases that they considered to be preventable, constituted the dependent variable. The independent variable was the frequency with which subjects engaged in such health-related behaviors as exercise, diet control, smoking and thrill seeking. Results showed that subjects differed significantly regarding their estimates of preventability of heart attack depending upon how much jogging and other exercise they did. People who jogged often thought heart attacks and hypertension were more preventable than did subjects who jogged less often or not at all. The differences in preventability estimates are discussed in terms of Weiner's model (1985) of attributions of success and failure. Implications for cognitive behavior modification and cooperation with prescribed lifestyle changes are also addressed.

key words: attribution, estimates of preventability, health behavior

Estimates of preventability and their relation to health behavior

Most of the research on attributions of success and failure is based on Weiner's (1985) notion that the nature of explanations of success and failure will have strong influence on future behavior and its success. The concepts of "success" and "failure" are interesting ones here. Certainly they are relative and subjective. Also, they come in many forms. Our health, for example, can be seen in terms of success and failure - we are successful when we are healthy and unsuccessful when we are not. Applying Weiner's logic to this, it should be the case that the way we explain our good health or lack of it will have an impact on the extent to which we actively attempt to attain good health.

Following this reasoning, studies have been conducted that link Rotter's (1966) locus of control with health behaviors (e.g., Best & Steffy, 1975). It was reasoned by Wallston, Wallston, Kaplan and Maides (1976) that there may be a set of attributions that were peculiar to health-related outcomes. From that came the Health Locus of Control scale (HLC) (Wallston, Wallston, Kaplan, & Maides, 1976) and the Multidimensional Health Locus of Control scales (MHLC; Wallston, Wallston, & De Vellis, 1978). One fundamental theoretical assumption underlies all this work: attributing health outcomes to modifiable sources results in healthier behavior.

Wallston et al.'s (1978) MHLC scale featured a problem with terminology when it introduced a dimension called Powerful Other , referring most commonly to one's doctor or other health professional. Where is the "locus" when one seeks the help of one's physician, or when one attributes one's good or bad health to health professionals? It is clearly a case of taking the initiative to do something for one's self, however the locus of the help is external. On the MHLC, Wallston et al. (1978) consider such Powerful Other items as "Whenever I don't feel well, I should consult a medically trained professional" to be a form of external locus. This jibes with Weiner's terminology in that the source is outside the individual, but it does not accurately address the more important notion of controllability. People "take control" of problems by soliciting the help of knowledgeable others.

The patient's intention here is clear - to get better. Seeking the help of health professionals is not so much an admission of lack of control, rather it must be based on the assumption (or at least the hope) that the symptoms are, in some way, controllable. Not surprisingly, the Powerful Other dimension does not correlate with either the internal or external dimension. This is due, in part, to the fact that the terms "internal" and "external" are ambiguous when used in this context, compared to "controllable" and "uncontrollable"

The concept of controllability can be applied to a time prior to the surfacing of symptoms as well. Here the issue is prevention, a major concern for the health psychologist. For prevention, the same reasoning should hold. People who think their health is attributable to modifiable sources should think also that health problems are, for the most part, preventable. Furthermore, people who think problems are preventable should engage in more preventive behaviors. It is hypothesized here tnat subjects' estimates of the preventability of health problems will be related to health behaviors such that people who engage in healthy behaviors should make higher estimates of preventability.

The HLC was based, in part, on the assumption that a person's beliefs regarding control would differ depending on the type of outcome being explained (Wallston et al., 1976). It may be the case, for example, that someone feels considerable control over his or her business affairs and social life, but no control whatsoever over his or her health. The specificity of the HLC, therefore, allowed it to be more closely correlated with health behaviors. For the present study, this reasoning was taken one step further, yielding the hypothesis that a scale measuring the beliefs regarding specific illnesses would be even more predictive than one that addressed health in general. Thus the rationale for the Preventability Scale.

Method

Participants

Sixty-one individuals from an Introductory Psychology class at Simon Fraser University took part in this study. Subjects ranged in age from 18 to 43 years (M = 24.0). Four participants did not complete all portions of the surveys and, therefore, had to be eliminated from the study, leaving a total of 57. Twenty-two were male and 35 were female.

Instruments

Participants were asked to complete three questionnaires, presented in a package, along with questions regarding age, sex and the distance they lived from the university.

The Preventability Scale (P-scale)

The first questionnaire presented subjects with 29 problems, 16 of which were directly health-related, and asked the subjects to estimate the percentage of cases for which the victim could have prevented the problem. For example, one particularly relevant item read: "What percentage of people suffering from heart attacks could have prevented their heart attack?"

The Multidimensional Health Locus of Control scales (MHLC)

Next came an 18 item questionnaire, designed by Wallston et al., (1978), that measures the extent to which subjects feel their health is under their control. Items tend to be very direct (e.g., "I am in control of my health", and, "My good health is largely a matter of good fortune".) Subjects are asked to state the extent of their agreement or disagreement with the statement using a 6-point scale, with strong disagreement at the left and

strong agreement at the right. The scale yields 3 subscales (dimensions), each measured by 6 items. These subscales include internal (IMHLC), external (EMHLC), and Powerful Other (PMHLC).

Self-report of health-related behaviors

The third questionnaire asked subjects to report on the frequency with which they engaged in health-related behaviors. Behaviors included eating habits, exercise, and risk taking. These were mixed with questions addressing issues not directly related to health, such as social activities and satisfaction with school. In all, there were 29 items: 9 items involving eating habits, another 8 involving exercise, one on frequency of cigarette smoking and one on thrill-seeking. Subjects were asked to estimate how often in the last month they had engaged in each of these behaviors and respond with either never, rarely, sometimes, or often. These were scored such that a high score indicated positive health-related behaviors.

Procedure

Subjects completed the questionnaires silently, and anonymously in a classroom setting, with 15 to 20 people in the room. They were provided initially with an information sheet stating the following:

> Health professionals have long believed that there is a relationship between a person's way of thinking and his or her physical health. Attitudes, beliefs, and the ways in which we explain health-related events are

examples of such thinking. The present study has been designed to examine links that may exist between certain thinking patterns and health behavior.

Subjects then completed a consent form that, in addition to asking for consent, reminded them that they may withdraw from the study at any time and that such withdrawal would in no way affect their marks in Psychology 101.

Results

Analyses of variance

One-way analyses of variance were performed using the responses to the health-related behaviors survey as the independent variables and selected estimates of preventability as the dependent variables. Results appear in Table 1. Subjects differed significantly in their estimates of preventability of heart attack, depending on how much running they did $F(3,53) = 2.79$, $p<.05$, (as measured by the statement "I have run continuously for 15 minutes or more.") and how much general exercise they did $F(3,53) = 8.46$, $p<.001$, (as measured by the statement "I have done sustained exercise for at least 15 minutes other than in games or classes {curricular or extracurricular}.").

Regular runners differed from others in their estimates of the preventability of hypertension as well, $F(3,53) = 3.34$, $p<.05$. Regular exercisers differed from others in their estimates of the preventability of lung cancer, $F(3,53) = 4.43$, $p<.01$. People who attended exercise classes regularly differed from others in their

estimates of the preventability of loneliness, $F(3,53) = 4.88$, $p<.01$, and unhappiness, $F(3,53) = 3.86$, $p<.05$.

Average estimates of preventability (reported in percentages) were calculated and the results are displayed in Table 2. The most preventable problems were thought to be course failure ($M = 82.30$), dental cavities ($M = 81.84$), home accidents ($M = 77.82$), one's own cavities ($M = 75.47$), and obesity ($M = 72.81$). The least preventable problems were considered to be diabetes ($M = 15.82$), chicken pox ($M = 17.72$), rape ($M = 30.58$), poverty ($M = 38.58$), and airplane accidents ($M = 40.10$).

Correlation matrix

Correlations were calculated for scales and subscales of the instruments administered and are presented in Table 3. The Preventability Scale (P-scale) was divided into healthrelated items (P-health) and items not related to health (P-Nhealth).

Discussion

The first hypothesis, that people who engage in healthy behaviors should make higher estimates of preventability, was supported by the data. This is especially the case when the health behavior involved continuous running or general, self-initiated exercise. Not surprisingly, the estimates of preventability that were most closely linked with these behaviors were those that the behaviors are expected to help prevent. For example, people who run see heart attacks as being significantly more preventable than do people who rarely run or do not run at

all.

Causal attributions, in fact, tend to be quite specific in nature. People who run seem to believe that running may decrease the likelihood of heart attack and that specific causal link sends them out for a jog.

Consistent with the notion of specificity, it was not found that high scores on the preventability scale as a whole were linked with high scores on the self-care survey. Put quite simply, it turned out that some of the behaviors featured on the self-care survey are not motivated by self-care. The best examples of this are playing on teams and playing games in general. People who played on teams were no more likely to believe that any of the health problems were preventable than were those who did not play on teams. The only significant difference in estimates of preventability here was for anorexia. For that problem, people who never played on a team gave higher estimates of preventability than did the team players. Similarly, people who played games often thought that headaches were less preventable than the people who never played did.

It would be unwise, therefore, to assume that these behaviors were engaged in for the sake of health. Interestingly, the two problems that people who often went to an organized exercise class thought were more preventable were unhappiness and loneliness. Both of these are social in nature. If belief regarding prevention is a motivator, then perhaps people who

attended exercise class did so for social reasons, rather than for their health, which they did not believe to be controllable.

The second hypothesis, that the preventability scale would be more predictive of self-care than the Multidimensional Health Locus of Control scales (MHLC) was not supported in the present study. The correlation between the preventability scale and the self-care survey was .23 compared to .27 between the IMHLC and the self-care survey. The EMHLC and the PMHLC, which should, theoretically, correlate negatively with the self-care survey did not do so, however.

Estimates of preventability: comparisons across illnesses

Dental cavities, obesity, lung cancer and heart attack were considered to be the most preventable medical problems (see Table 2). Diabetes (the least preventable problem of all posed), chicken pox, colds, and headaches were considered least preventable. (The most preventable problem posed was "failing a course".)

The problems judged to be most preventable are those that have been the target of active publicity campaigns. Surgeon General's warnings on cigarette advertising link smoking with lung cancer and thus imply that many cases of the disease could be prevented if people did not smoke. One can hardly pick up a magazine today without finding an article on the effects of diet, exercise, stress and heredity on cardio-vascular health. The first three of these factors make a strong case for the

preventability of cardio-vascular illness.

Diabetes, on the other hand, has not yet been linked to a collection of identifiable risk factors. Prevention of chicken pox requires avoiding contact with someone with the illness. Unfortunately, such people are most contagious before they break out in spots and are thus very difficult to identify. The common cold is, to a large extent, seasonal and "in the air". Since we can avoid neither seasons nor air it is considered very difficult to prevent the common cold.

All of this reasoning can be analyzed using Weiner's (1985) attribution model. Health campaigns, such as those designed to convince people to quit smoking or increase their exercise, attempt to raise people's low estimates of preventability of the illnesses since these estimates are related to poor habits in these areas. They present the idea that such illnesses are caused by controllable factors, either internal or external.

Those disorders that are not considered to be as preventable are obviously attributed to nonmodifiable causes. In Weiner's model, these causes are either internal (part of an enduring character) or external (luck). In health psychology, these internal causes surface as "constitution" (as in strong or weak) or psychoneuroimmunology, and the external as viruses (as in "It must be some sort of virus"), unavoidable bacteria (as in "I've picked up a bug of some kind") or other contagion.

Direction of causality

For the purposes of the present study, the independent variables were determined by the self-care survey, for example, the amount of exercise the subject engaged in. The dependent measure was either estimates of preventability or the scores on the MHLC. This implies a direction of causality such that behavior (e.g., jogging) influences cognition (estimates of preventability or control). It is, of course, equally possible that the cognition influences the behavior. Thinking that illnesses are preventable encourages the person to engage in preventive behaviors.

If the process is conceptualized as behavior affecting cognition, then the cognition may be the justification for the behavior, in the form of effort justification, or dissonance reduction. Another possibility is that the person receives rewarding feedback from the behavior, such as feeling and looking better. This influences beliefs (cognitions) about the value of the behavior and thus the preventability of related health problems.

If one's goal is to facilitate cooperation with prescribed medical treatment regimens for such problems as hypertension, and if cognitive behavior modification is used, then it is cognition influencing behavior that we are most interested in. The task becomes one of convincing the patient that hypertension is preventable.

Comparing the Preventability Scale and the MHLC Scale

It is likely that the Preventability Scale and the IMHLC Scale are measuring similar constructs (r = .48 between the two scales). In fact, to a certain extent, the EMHLC and P-scale are related (r = .38 between the two scales). The construct in both cases is control of one's health, whether it be by one's self or by others.

Is it important to specify that it is one's health that is the focus of that control, if one wishes to use the construct as a predictor of health behaviors? The answer appears to be yes. Even though the correlation between health-related and nonhealth-related items on the P-scale was .83, suggesting a general tendency regarding beliefs about control, when it comes to linking behavior with estimates of preventability there is a strong demand for specificity. People who run often consider heart attacks to be more preventable than do people who run less often or not at all. However, runners do not differ from non-runners in their estimates of the preventability of rape, diabetes, failure at school, poverty, or any other of a host of problems that are not specifically linked to running, presumably in the runner's belief system.

These findings are consistent with studies investigating the relationship between attitude and behavior (e.g., Ajzen, Timko, & White, 1982). In these studies, it has been concluded that specific attitudes can be predictive of specific behaviors, but general attitudes cannot. In terms of the present study, it may

be the case that people have general tendencies when it comes to beliefs about the prevention and control of problems, but only specific beliefs will be linked to specific health behaviors.

Perceived invulnerability as a confounding variable

If it is true that people who engage in healthy behaviors such as exercise have higher estimates of the preventability of related illnesses, then it should also be the case that people who actively engage in unhealthy behaviors should have lower estimates. For example, people who smoke should have lower estimates of the preventability of lung cancer, heart attack and hypertension. Yet this was not found in the present study. In fact, smokers gave higher estimates of the preventability of hypertension than nonsmokers did. Smokers and nonsmokers showed no significant difference in their estimates of the preventability of heart attack or lung cancer.

This may be because smokers apply a different set of rules to themselves than to others. They may truly believe that lung cancer can be prevented and that smoking reduces the likelihood of that prevention for most people. For the individual smoker, however, there is the belief that he or she is somehow invulnerable to the illness. The Preventability Scale did contain some items that compared estimates of preventability of other people's headaches, colds, depression and cavities to the subject's own. However, no significant self-other differences were found for these problems.

Future versions of the Preventability Scale will ask subjects to estimate the preventability of their own lung cancer and heart attacks to see if more severe and relevant problems feature any self-other bias. There is convincing evidence to suggest that people ignore population base rates when making judgments (Kahnneman & Tversky, 1973; Tversky & Kahnneman, 1974) so it may stand to reason that the odds that are estimated for the general population are not taken into consideration by the respondent when estimating his or her own vulnerability to a particular illness.

Summary

In terms of our health, our sense of control over, or estimated preventability of, problems depends upon the nature of the problem. For example, scientific knowledge of the epidemiology of such illnesses as diabetes is such that clear risk factors have not yet been identified. For such illnesses, the layperson's estimates of preventability are low. However, for illnesses whose prevention behaviors have been the subject of considerable publication, then the estimates of preventability tend to be higher.

For any given health problem, people's estimates of its preventability differ depending upon the extent to which they engage in behaviors that help prevent the problem. The causal direction of this process is not clear and, perhaps, not particularly important. It may be the case that people's beliefs

about preventability cause them to practise preventive behaviors. It may also be that the behaviors themselves cause the person to change his or her beliefs regarding preventability. The former direction is a concern for those practising cognitive behavior modification. The latter is for those who are interested in the effects of counterattitudinal behavior, effort justification or dissonance reduction.

For the health professional, the relevance of the present study is that beliefs regarding preventability and preventive behavior are, not surprisingly, linked. They are linked such that specific preventability estimates (e.g., of heart attacks) are related to specific health-related behaviors (in this case, jogging). These findings suggest that attempts to modify patients' behavior so that they cooperate with lifestyle-related regimens may be most successful if convincing evidence regarding preventability is presented rather than a graphic portrayal of symptoms.

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Table 1

Estimates of preventability for selected problems by frequency of self-care behavior

Behavior	Problem	Frequency				$p<$
		Never	Rare	Some	Often	
Team	Anorexia	68.13	25.00	93.25	45.28	.01
Running	Heart attack	56.11	55.55	66.43	70.00	.05
	Hypertension	56.05	48.80	77.86	62.04	.05
Other ex.	Heart attack	48.18	57.50	59.54	75.24	.001
	Lung cancer	61.36	47.93	68.18	78.05	.01
Ex. class	Unhappiness	66.51	61.37	62.00	86.00	.05
	Loneliness	64.10	65.91	71.80	88.58	.01

Table 2

Estimates of preventability for health problems

Health problem	Preventability estimate
Cavities	82.84
Obesity	72.81
Lung cancer	65.53
Heart attack	62.63
Hypertension	59.77
Die by 40	58.45
Anorexia	57.47
Die by 50	53.54
Headaches	49.01
Die by 60	46.19
Cold	41.54
Chicken Pox	17.71
Diabetes	15.82

Table 3

Correlations among scales and subscales

	Self-care	P-scale	IMHLC	EMHLC	PMHLC	P-Health	P-Nhealth
Self-care	X	.23	.27	.10	-.06	.18	.27
P-scale		X	.48	.38	.19	.97	.94
IMHLC			X	.36	.02	.53	.38
EMHLC				X	.20	.40	.32
PMHLC					X	.23	.11
P-Health						X	.83